UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,218	04/26/2006	Shoji Shiba	03500.518677.	3411

5514 7590 03/20/2009

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
EOFF, ANCA	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
03/20/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,218	SHIBA ET AL.	
	Examiner	Art Unit	
	ANCA EOFF	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01/15/2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8-12 and 15-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8-12 and 15-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04/26/2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 8-12 and 15-19 are pending in the application. Claims 1-7, 13-14 and 20-21 are canceled.

2. The foreign priority document JP 2004-190479 filed on June 28, 2004 was received and acknowledged. However, in order to benefit of the earlier filing date, a certified English translation is required.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 15, 2009 has been entered.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 8-12 and 15-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 8 and 15 recite the limitation “the photolithographic resin composition". There is insufficient antecedent basis for this limitation in the claims, as the resin composition is referred to as “photosensitive resin composition”.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 8-12 and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyagawa et al. (US Pg-Pub 2003/011655) in view of Kubota et al. (US Pg-Pub 2004/0072107) and in further view of Imai et al. (US Pg-Pub 2004/0081914).

With regard to claim 8, Miyagawa et al. disclose a process of forming a liquid discharge head, said process comprising the steps of:

(1) applying on a base plate 31 a positive resist layer (32) and applying a positive layer (33) on top of the positive layer (32).(fig. 4B, par.0098-0099);

(2) exposing and developing the positive layer (33) (fig. 4C and 4D , par.0101-0102)

(3) exposing and developing the positive layer (32) (fig 4E and 4F, par.0103-0104).

Miyagawa et al. further disclose that the bottom layer/layer (32) and the upper layer/ layer (33) are made of a decomposing type positive resist (par.0039) but fail to disclose that the decomposing type positive resist has the composition of the instant application.

Kubota et al. teach a method of producing a liquid discharge head using a photodegradable positive working resist having a carboxylic anhydride structure (par.0050).

Kubota et al. disclose a photodegradable positive working resist having a carboxylic anhydride structure (par.0050), such as a methyl methacrylate / methacrylic acid / methacrylic anhydride copolymer (par.0085), wherein the methacrylic anhydride unit is equivalent to the unit of formula (2) of the instant application, wherein R_3 and R_4 are methyl groups.

Since Kubota et al. teaches a photodegradable positive working resist used for the production of liquid discharge heads, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the photodegradable positive resist of Kubota, as decomposing type positive resist for the layers (32) and (33) for the method of Miyagawa et al.

Kubota el. further disclose that during heating the layer of positive-working photosensitive material, a crosslinked material layer is formed (par.0016). During the exposure step, the irradiation with an ionizing radiation decomposes the crosslinked positive-working photosensitive material on a predetermined area of the crosslinked positive-working photosensitive material layer (par.0017). During development, the area

irradiated by ionizing radiation is removed from the substrate, thereby obtaining a non-irradiated area as a desired pattern on a substrate (par.0018).

However, Miyagawa and Kubota fail to disclose that the positive-working photosensitive material comprises a compound that generates acid when irradiated with light, as required by the instant application.

Imai et al. disclose a positive working resin composition comprising a base polymer, an ether-bond-containing olefinic unsaturated compound as crosslinker and an acid-generating agent (abstract).Imai et al. further disclose that when a film formed from the above-mentioned composition is heated, the carboxyl groups of the base resin and the ether groups in the unsaturated compounds form crosslinks to make the film insoluble to a solvent or aqueous alkali solution (par.0097 and par.0110).Subsequently, by irradiating with an active energy beam and heating, an acid is generated, which acts as a catalyst to cleave the crosslink structure. Thus, the exposed part again becomes soluble to a solvent or aqueous alkali solution (par.0110).

Imai et al. further disclose that the acid generating agent acts as a catalyst for decomposing the croslinked polymer film (par.0099).

As the positive working resists of Kubota et al. and Imai et al. have a similar mode of operation (crosslinking during the pre-baking step and photodegradation/decomposition of the crosslinked polymer during the exposure step), it would have been obvious to one of ordinary skill in the art at the time to the invention to use the acid-generating agent of Imai et al. in the positive working composition of

Miyagawa modified by Kubota, in order to take advantage of the acid generator which acts as a catalyst for decomposing the crosslinked resist film (Imai et al., par.0099).

The steps (1) and (2) of the process of Miyagawa modified by Kubota and Imai are equivalent to the steps (1) and (2) of the instant application. The structure shown in fig. 4D of Miyagawa et al. is equivalent to "the first pattern composed of a part protruding from a predetermined depth" of the instant application.

The step (3) of the process of Miyagawa modified by Kubota and Imai is equivalent to the step (3) of the instant application. The structure shown in fig. 4F of Miyagawa et al. is equivalent to the "pattern having a level difference shape in which the first pattern is placed on the second pattern".

With regard to claim 9, Miyagawa et al. disclose that the upper layer (33) is exposed to radiation with a wavelength of 290 nm (par.0101) and the lower layer (32) is exposed to radiation with a wavelength of 250 nm (par.0103).

The exposure of the upper layer (33) is equivalent to the exposure in the first photolithographic step of the instant application and the exposure of the lower layer (32) is equivalent to the exposure in the second lithographic step of the instant application.

With regard to claims 10-12, Kubota et al. further disclose that the developing liquid for the positive-working resist composition is a liquid containing a glycol ether having 6 or more carbon atoms, such as diethylene glycol monobutyl ether, a nitrogen-containing basic organic solvent, such as ethanolamine and morpholine and water (par.0062).

With regard to claim 15, Miyagawa et al. disclose a process comprising the steps of:

(1) applying on a base plate 31 a positive resist layer (32) and applying a positive layer (33) on top of the positive layer (32).(fig. 4B, par.0098-0099);

(2) exposing and developing the positive layer (33) (fig. 4C and 4D , par.0101-0102);

- (3) exposing and developing the positive layer (32) (fig 4E and 4F and par.0103-0104);

(4) coating a liquid flow-path structural material (34) over the layers (32) and (33) (fig. 4G, par.0105)

(5) forming an ink discharge port (35) (fig. 5B and par.0107);

(6) removing the positive resists (32) and (33) by exposure followed by development (fig. 5C and 5D, par.0108-0109).

Miyagawa et al. further disclose that the base plate may be provided with an electrothermal converting element or a piezoelectric element (par.0127), which are equivalent to the energy generating element of the instant application.

Miyagawa et al. further disclose that the bottom layer/layer (32) and the upper layer/ layer (33) are made of a decomposing type positive resist (par.0039) but fail to disclose that the decomposing type positive resist has the composition of the instant application.

Kubota et al. teach a method of producing a liquid discharge head using a photodegradable positive working resist having a carboxylic anhydride structure (par.0050).

Kubota et al. disclose a photodegradable positive working resist having a carboxylic anhydride structure (par.0050), such as a methyl methacrylate / methacrylic acid / methacrylic anhydride copolymer (par.0085), wherein the methacrylic anhydride unit is equivalent to the unit of formula (2) of the instant application, wherein R_3 and R_4 are methyl groups.

Since Kubota et al. teaches a photodegradable positive working resist used for the production of liquid discharge heads, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the photodegradable positive resist of Kubota, as decomposing type positive resist for the layers (32) and (33) for the method of Miyagawa et al.

Kubota el. further disclose that during heating the layer of positive-working photosensitive material, a crosslinked material layer is formed (par.0016). During the exposure step, the irradiation with an ionizing radiation decomposes the crosslinked positive-working photosensitive material on a predetermined area of the crosslinked positive-working photosensitive material layer (par.0017). During development, the area irradiated by ionizing radiation is removed from the substrate, thereby obtaining a non-irradiated area as a desired pattern on a substrate (par.0018).

However, Miyagawa and Kubota fail to disclose that the positive-working photosensitive material comprises a compound that generates acid when irradiated with light, as required by the instant application.

Imai et al. disclose a positive working resin composition comprising a base polymer, an ether-bond-containing olefinic unsaturated compound as crosslinker and an acid-generating agent (abstract).Imai et al. further disclose that when a film formed from the above-mentioned composition is heated, the carboxyl groups of the base resin and the ether groups in the unsaturated compounds form crosslinks to make the film insoluble to a solvent or aqueous alkali solution (par.0097 and par.0110).Subsequently, by irradiating with an active energy beam and heating, an acid is generated, which acts as a catalyst to cleave the crosslink structure. Thus, the exposed part again becomes soluble to a solvent or aqueous alkali solution (par.0110).

Imai et al. further disclose that the acid generating agent acts as a catalyst for decomposing the croslinked polymer film (par.0099).

As the positive working resists of Kubota et al. and Imai et al. have a similar mode of operation (crosslinking during the pre-baking step and photodegradation/decomposition of the crosslinked polymer during the exposure step), it would have been obvious to one of ordinary skill in the art at the time to the invention to use the acid-generating agent of Imai et al. in the positive working composition of Miyagawa modified by Kubota, in order to take advantage of the acid generator which acts as a catalyst for decomposing the crosslinked resist film (Imai et al., par.0099).

The steps (1) and (2) of Miyagawa modified by Kubota and Imai are equivalent to the steps (1) and (2) of the instant application. The structure shown in fig. 4D of Miyagawa et al. is equivalent to the “first ink flow path pattern composed of a part protruding from a predetermined depth" of the instant application.

The step (3) of Miyagawa modified by Kubota and Imai is equivalent to the step (3) of the instant application.The structure shown in fig. 4F of Miyagawa et al. is equivalent to the “second ink flow pattern on which the first ink flow pattern is formed” of the instant application.

The step (4) of Miyagawa modified by Kubota and Imai is equivalent to the step (4) of the instant application, wherein the liquid flow-path structural material (34) is equivalent to the “coating resin layer for forming an ink flow path wall” of the instant application.

The step (5) of Miyagawa modified by Kubota and Imai is equivalent to the step (5) of the instant application.

The step (6) of Miyagawa modified by Kubota and Imai is equivalent to the step (6) of the instant application. The positive resists (32) and (33) are equivalent to the “level difference structure” of the instant application.

With regard to claim 16, Miyagawa et al. disclose that the upper layer (33) is exposed to radiation with a wavelength of 290 nm (par.0101) and the lower layer (32) is exposed to radiation with a wavelength of 250 nm (par.0103).

The exposure of the upper layer (33) is equivalent to the exposure in the first photolithographic step of the instant application and the exposure of the lower layer (32) is equivalent to the exposure in the second lithographic step of the instant application.

With regard to claims 17-19, Kubota et al. further disclose that the developing liquid for the positive-working resist composition is a liquid containing a glycol ether having 6 or more carbon atoms, such as diethylene glycol monobutyl ether, a nitrogen-containing basic organic solvent, such as ethanolamine and morpholine and water (par.0062).

Response to Arguments

8. Applicant's arguments with respect to the amended claims 8 and 15 have been considered but are moot in view of the new grounds of rejection.

On pages 1-2 of the Remarks filed on December 16, 2008, the applicant shows that the amended claims 8 and 15 overcome the prior art rejection presented in the Final Rejection mailed on September 18, 2008.

However, new grounds of rejection are presented above in paragraphs 4-7.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. E./
Examiner, Art Unit 1795

/Cynthia H Kelly/
Supervisory Patent Examiner, Art Unit 1795